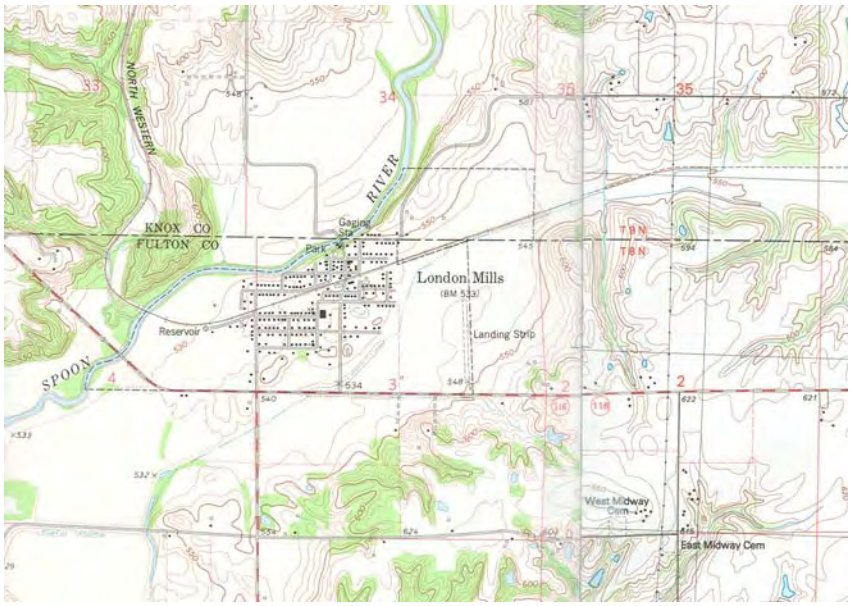
Midwest Technology Assistance Center
Groundwater Resource Assessment for Small Communities

Groundwater Availability
at
London Mills, Illinois
(Fulton County)

Project Overview
This project is an outgrowth of the Public Service Program of the Center for Groundwater Science (CGS) at the Illinois State Water Survey. For over 50 years, the CGS has provided groundwater information to any requesting individual, commercial facility or public water facility. Groundwater resource assessments have been an integral part of this public service and have been undertaken for thousands of individuals and facilities throughout its history. Community groundwater supplies that have been identified as potentially "deficient" are the targets for this project. The criterion used for determining community deficiency were; 1) Water Supply and Demand (operating time), 2) Aquifer Limitation, 3) Well Specific Capacity, and 4) Facility History. The Village of London Mills has been identified as a target community for groundwater assessment through this project.

Project Goal
To provide a resource tool of pertinent groundwater information to each target facility. This document describes a summary of historic information, current conditions and the potential for expansion of the water supply within 5 and 10 miles of London Mills.

London Mills (Fulton County)



The Village of London Mills, Fulton County, currently obtains groundwater from two community supply wells (Well #2 and Well #3). The wells supplied an average of 4,425 gallons of water per day during 2005 to the Villages' 170 residents. The Village also supplies 4 commercial services. Well #2 is 25 feet deep and pumps 25 gallons per minute, while well #3 is 28 feet deep and pumps 32 gallons per minute. The project criterion ranked London Mills as "deficient" mainly due to its shallow water table wells and calculated long pumping periods to obtain its daily supply.

Historic Information

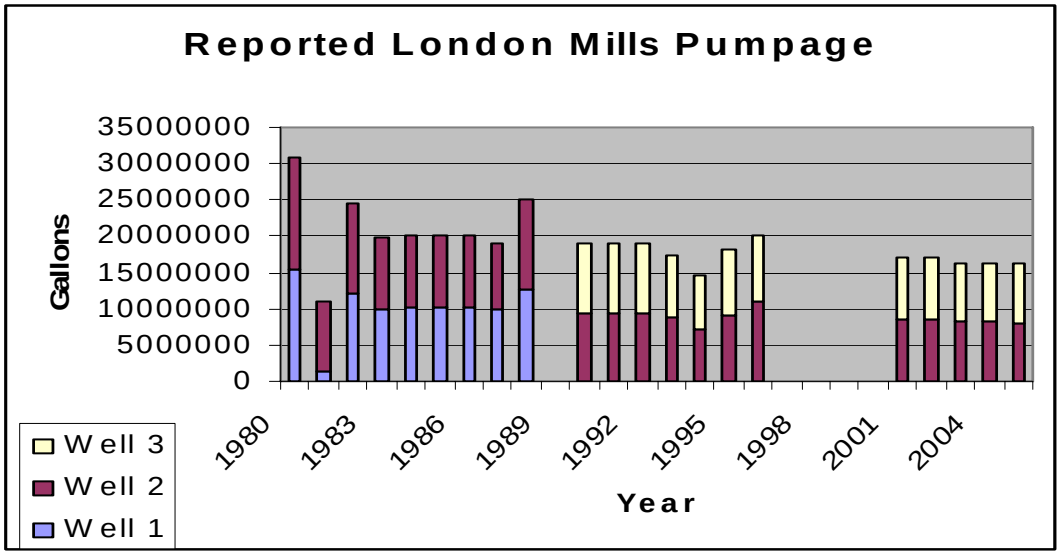
Background Well Information

Well No.1
Finished in shallow sand and gravel deposits in the floodplain of the Spoon River located west of the village in Section 4, T.8N., R.2E., Fulton County. The well was drilled to a depth of 23 feet in 1941 and, upon completion, reportedly produced 56 gallons per minute (gpm) for 5 hours with 3.5 feet of drawdown. Calculated specific capacity from this test was 16.0 gpm/ft. Static water level was reported as 15 feet below land surface. Long-term yield was estimated at 22 gpm. The well was filled in 1989.

Well No.2
Finished in shallow sand and gravel deposits in the floodplain of the Spoon River located to the west of the village in Section 4, T.8N., R.2E., Fulton County. The well was finished at a depth of 25 feet in 1955, upon completion, the well reportedly produced 40 gpm for 4 hours with 4.4 feet of drawdown. Calculated specific capacity from this test was 9.0 gpm/ft. Static water level was reported as 16.8 feet below land surface.

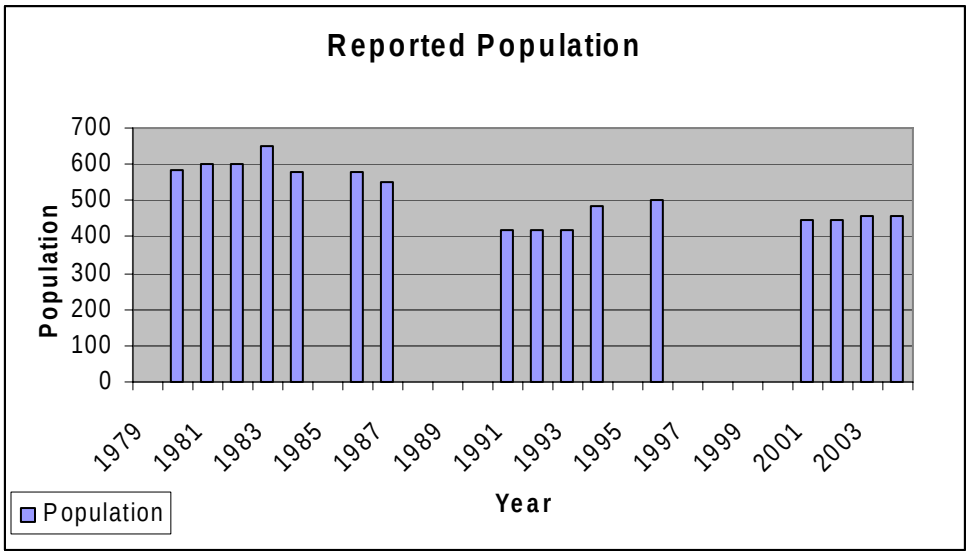
Well No.3
Finished in shallow sand and gravel deposits in the floodplain of the Spoon River located to the west of the village in Section 4, T.8N., R.2E., Fulton County. The well was drilled to a depth of 28 feet in 1989 and, upon completion, reportedly produced 36 gpm for 0.5 hours with 3.7 feet of drawdown. Calculated specific capacity from this test was 9.9 gpm/ft. Static water level was reported as 23.2 feet below land surface.

Background Pumpage Information



Source: ISWS Illinois Water Inventory Program

Historic Population Information



Source: ISWS Illinois Water Inventory Program

Regional Information

Resources within 5 miles of London Mills (Figure 1).

Domestic Groundwater Supplies
The available regional data indicate that groundwater for domestic and farm use in this part of Illinois is obtained from large-diameter (approximately 3 feet) dug and bored wells finished in the unconsolidated materials above bedrock and from small-diameter dilled wells finished within the shallow bedrock. The dug and bored wells tap stringers or lenses of silt, sand, or gravel only a few inches thick contained in the unconsolidated materials above bedrock. They range in depth from about 31 to 53 feet. The yield of this type of well is limited to a few hundred gallons per day and may be only barely adequate for normal household uses.

A few reported wells in the area have been drilled into the underlying Pennsylvanian bedrock formations. These wells are finished in thin sandstone and creviced limestone beds in the shallow bedrock and range in depth from about 200 to 320 feet. Upon completion, these wells were pumped at rates ranging from 4 to 20 gallons per minute for short periods of time. Methane gas has also been reported from some of these wells.

Municipal Groundwater Supplies
There is only one town within five miles of London Mills; the village of Hermon, located to the northwest. This village does not have a public water supply system and is presumed to have private wells for its residents. Shallow bedrock wells are prevalent in this area.

Resources with 10 miles of London Mills (Figure 2).

Municipal Groundwater Supplies
Towns within 5 to 10 miles of London Mills include:
Rapatee, Middle Grove, Fairview, Ellisville, and Avon in Fulton County; and St. Augustine, Abingdon, De Long, and Maquon in Knox County.

The Villages of Avon, St. Augustine, and Maquon are the only towns that maintain wells for a municipal supply in the London Mills area. Avon has just recently found sand and gravel deposits capable of providing almost 200 gpm for the village needs. These deposits are located in Section 35, T.8N., R.1E., Fulton County and took over three years of resistivity work and test drilling to find. St. Augustine, located to the west of London Mills, uses two wells located in Section 32, T.9N., R.1E., Knox County. The wells are finished with the shallow bedrock at depths of 87 and 170 feet. They tap sandstone and dolomite formations, respectively. Maquon, located to the northeast, uses one well finished at a depth

of 638 feet below land surface. This well taps the Silurian limestone in Section 4, T.9N., R.3E., Knox County.

All the remaining small towns located in the study area purchase their water from a larger local facility such as Canton, or have private wells for the residents' needs.

Figures 3 and 4 picture the ISWS Potential Yield maps for sand and gravel and bedrock aquifer in Illinois, respectively. The pertinent counties for London Mills are highlighted. Figure 3 indicates that productive sand and gravel deposits are rare throughout most of the London Mills area and no major deposits are indicated except those sands associated with Spoon Creek where Avon's original supply wells were developed. The bedrock map (Figure 4) indicates poor availability of groundwater from the bedrock throughout the London Mills area. Figures 5 and 6 present the probability of occurrence of the sand and gravel and the water-yielding character of the shallow bedrock for the London Mills area as depicted in the Illinois State Geologic Survey Circular 222, *Groundwater Geology in Western Illinois, North Part* (Bergstrom, 1956). Figure 5 indicates "Fair to Good," variable and discontinuous sand and gravel deposits and Figure 6 indicates small supplies are available from limestone and dolomite units of the shallow bedrock. The domestic well construction records verify these map outlooks.

Figure 1. 5-mile radius map- London Mills

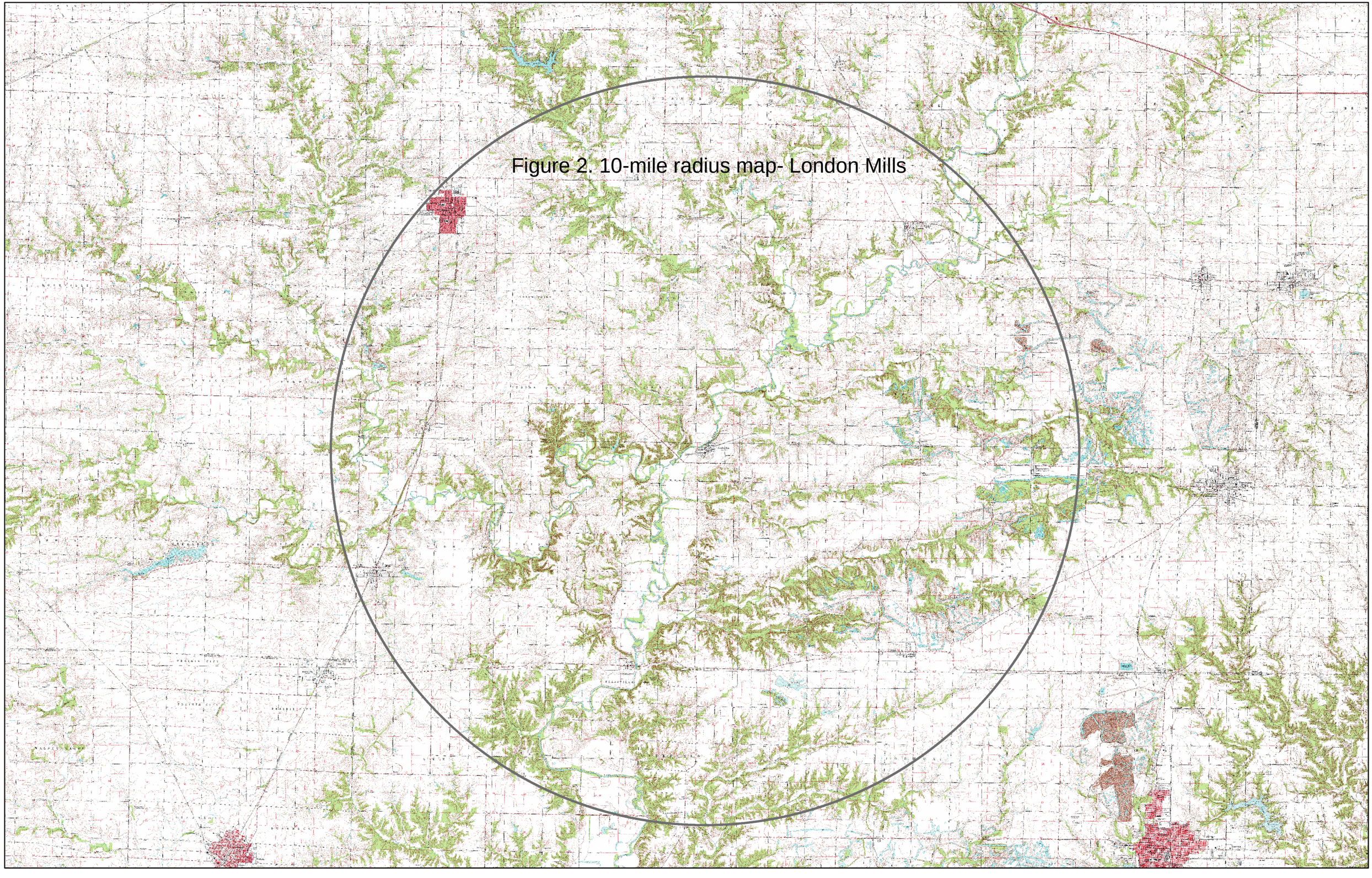


Figure 2. 10-mile radius map- London Mills

Groundwater Availability Summary

Reported information indicates that the sand and gravel deposits the Village uses are quit extensive within the floodplain of the Spoon River. However, they also are reported to be very thin throughout the entire floodplain area. This is affirmed by the Village pumpage from their wells and the domestic wells that have been developed in the area. The tested rates for the current supply wells were around 50 gpm, but the long-term yields of the wells have been tested to be around 20 gpm. This is mainly due to the available drawdown in the well and the sand and gravel thickness. Other public water supplies in this area have had historic problems in securing good quantities of groundwater for various reasons. The Village of Avon's original well field was very limited because of the shallow, thin deposits that were available next to Swan Creek. Thicker sands do exist near Avon but are most likely not a practical solution for increasing or replacing the wells at London Mills. It does appear that the current village wells are providing enough groundwater for the residents; however, the low aquifer yield resulting in low production rates causes a long pumping period for securing the required water. If the village was looking to expand their system, a new well field, away from the current two wells, would be recommended. Sand deposits along the Spoon River to the southwest (southern half of Section 4, T.8N., R.2E., Fulton County) would be recommended for exploration. A new well field at least one-half mile from the existing wells would ensure no interference between wells. This would entail electrical earth resistivity testing, test well drilling, and well production testing.

Estimated Potential Yields of Sand and Gravel Aquifers
in London Mills Area

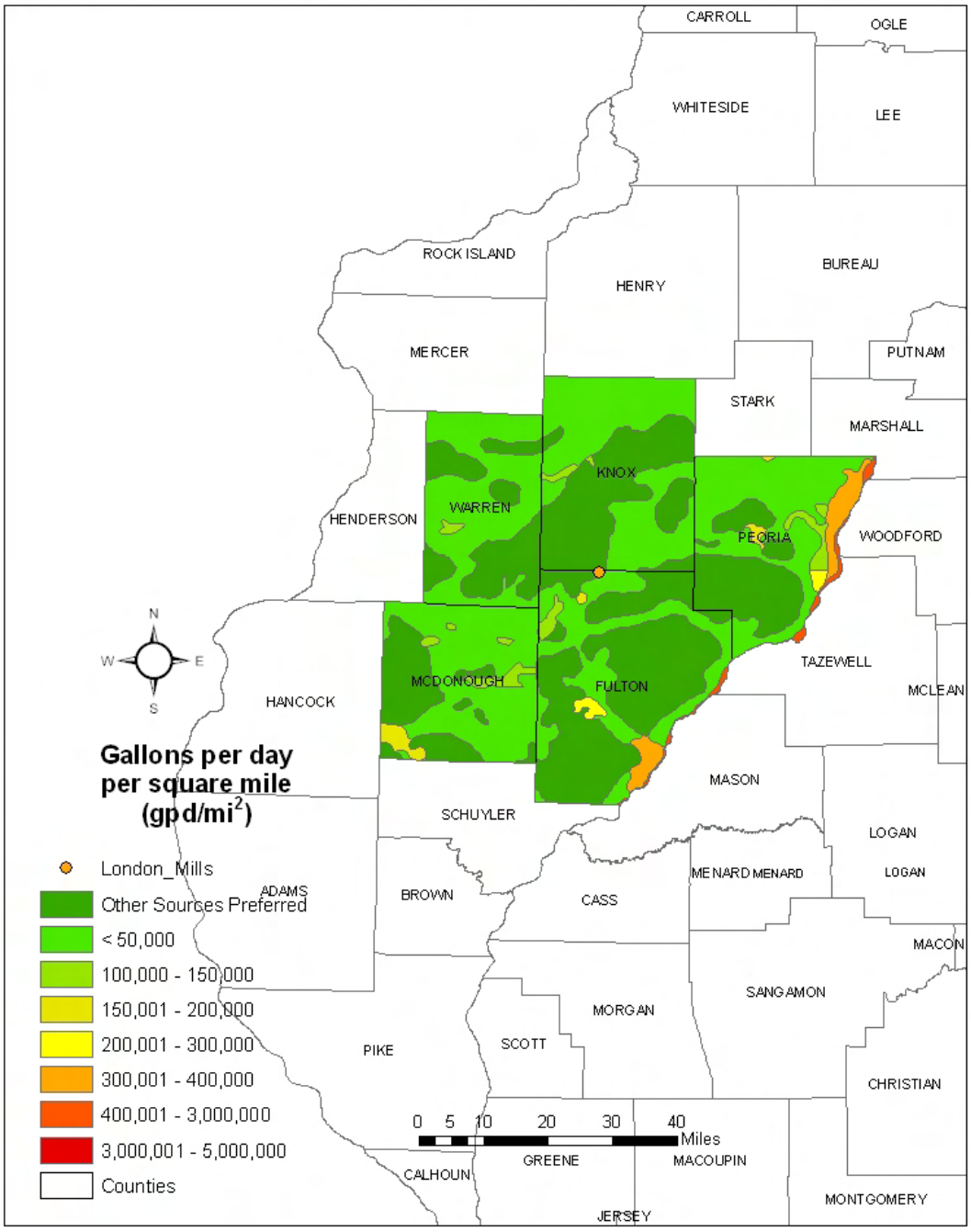


Figure 3.

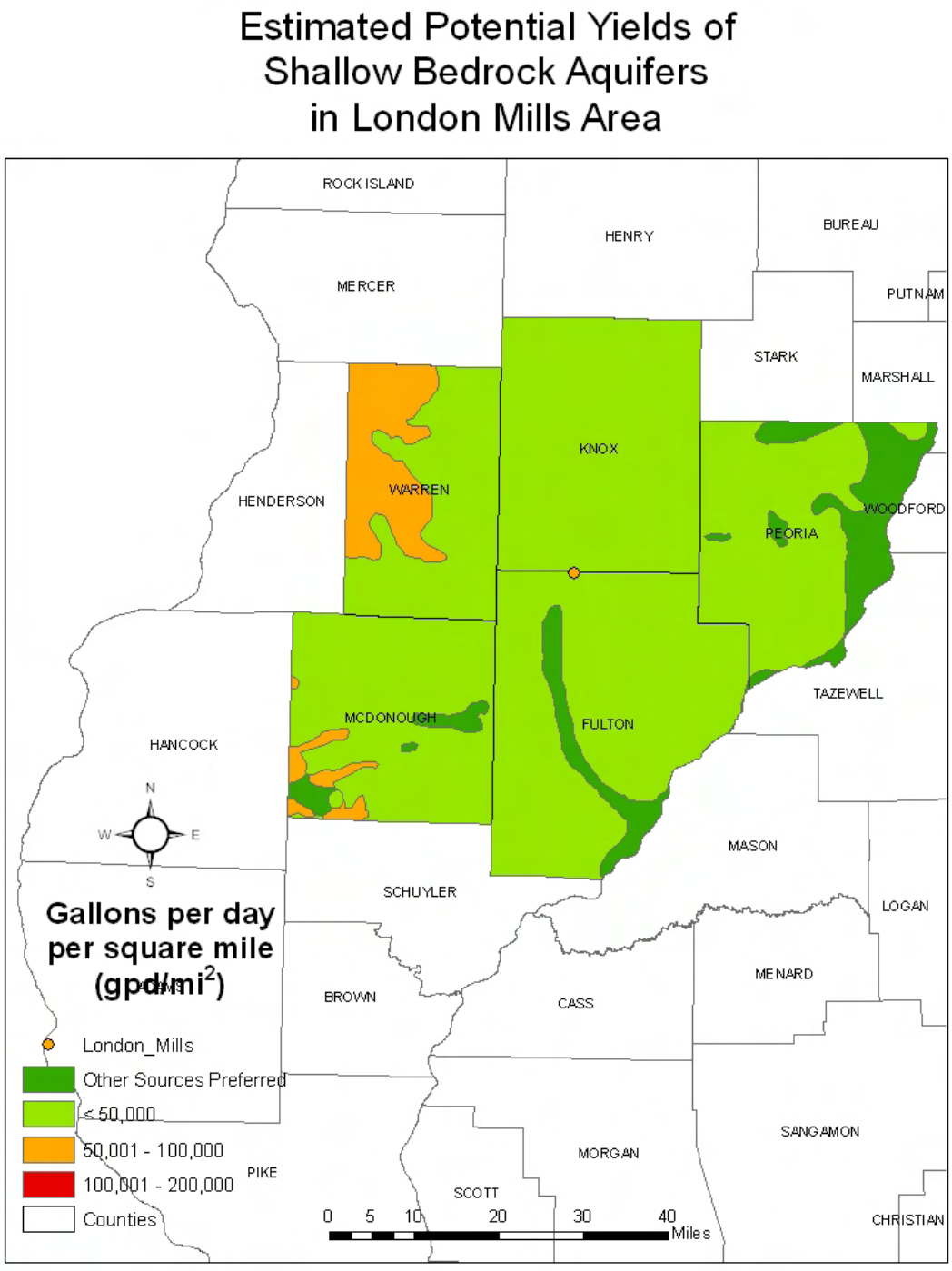

Estimated Potential Yields of
Shallow Bedrock Aquifers
in London Mills Area
ROCK ISLAND
HENRY
BUREAU
MERCER
PUTNAM
STARK
MARSHALL
KNOX
HENDERSON
WARREN
WOODFORD
PEORIA
TAZEWELL
MCDONOUGH
FULTON
HANCOCK
N
W
E
S
MASON
SCHUYLER
LOGAN
MENARD
BROWN
CASS
SANGAMON
MORGAN
PIKE
SCOTT
CHRISTIAN
Gallons per day
per square mile
(gpd/mi2)
London_Mills
Other Sources Preferred
< 50,000
50,001 - 100,000
100,001 - 200,000
Counties
0 5 10 20 30 40
Miles

Figure 4.

Fig. 6. - Probability of occurrence of sand and gravel aquifers.

Figure 5.

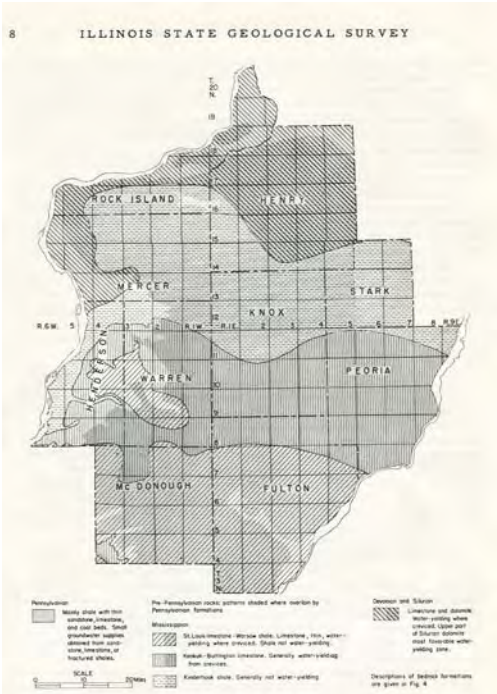


Fig. 5. - Areal distribution, type, and water-yielding character of upper bedrock formations (modified from Illinois Geologic Map, 1945).

Figure 6.

References

Bergstrom, R.E. 1956. Groundwater Geology In Western Illinois, North Part. A preliminary Geologic Report. Illinois State Geological Survey Circular 222.

ISWS publications list for the London Mills and surrounding areas
(* indicates out of print)

FULTON

*1950	B-39	Groundwater in the Peoria region. Horberg-Suter-Larson. 128p.
*1962	RI-43	Yields of deep sandstone wells in northern Illinois. Walton-Csallany. 47p.
*1963	RI-46	Yields of shallow dolomite wells in northern Illinois. Csallany-Walton. 44p.
*1965	COOP-3	Preliminary report on the ground-water resources of the Havana region in west-central Illinois. Walker-Bergstrom-Walton. 61p.
*1966	RI-55	Yields of wells in Pennsylvanian and Mississippian rocks in Illinois. Csallany. 42p.
*1978	CR-199	Reconnaissance study of final cut impoundments. Gibb-Evans. 101p.
*1979	CR-208	Groundwater conditions and river-aquifer relationships along the Illinois Waterway. Gibb-Noel-Bogner-Schicht. 87p.
*1980	CR-237	Assessment of eighteen public groundwater supplies in Illinois. Wehrmann- Visocky-Burris-Ringler-Brower. 185p.
1982	C-154	Water level trends, pumpage, and chemical quality in the Cambrian-Ordovician aquifer in Illinois, 1971-1980. Sasman-Benson-Ludwigs-Williams. 64p. $6.00.
1985	COOP-10	Geology, hydrology, and water quality of the Cambrian and Ordovician Systems in northern Illinois. Visocky-Sherrill-Cartwright. 136p.

*1989 CR-473 Regional assessment of northern Illinois ground-water resources. Nealon-Kirk-Visocky. 83p.

KNOX

*1962 RI-43 Yields of deep sandstone wells in northern Illinois. Walton-Csallany. 47p.

*1963 RI-46 Yields of shallow dolomite wells in northern Illinois. Csallany-Walton. 44p.

*1978 CR-199 Reconnaissance study of final cut impoundments. Gibb-Evans. 101p.

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1985 COOP-10 Geology, hydrology, and water quality of the Cambrian and Ordovician Systems in northern Illinois. Visocky-Sherrill-Cartwright. 136p.

*1987 B-60-34 Public ground-water supplies in Knox County. Woller-Sanderson-Sargent-Olson. 128p. $5.00.

*1989 CR-473 Regional assessment of northern Illinois ground-water resources. Nealon-Kirk-Visocky. 83p.

McDONOUGH

*1989 CR-473 Regional assessment of northern Illinois ground-water resources. Nealon-Kirk-Visocky. 83p.

PEORIA

*1940 B-33 Water resources in Peoria-Pekin district. 114p.

*1949 RI-5 Infiltration of soils in the Peoria area. Stauffer. 24p.

*1950 B-39 Groundwater in the Peoria region. Horberg-Suter-Larson. 128p.

*1956 C-54 High-rate recharge of ground water by infiltration. Suter. 5p.

*1960 B-48 Artificial ground-water recharge at Peoria, Illinois. Suter-Harmeson. 48p.

*1962	RI-43	Yields of deep sandstone wells in northern Illinois. Walton-Csallany. 47p.
*1963	RI-46	Yields of shallow dolomite wells in northern Illinois. Csallany-Walton. 44p.
1965	COOP-3	Preliminary report on the ground-water resources of the Havana region in west-central Illinois. Walker-Bergstrom-Walton. 61p.
1968	RI-60	Coarse filter media for artificial recharge. Thomas. 23p.
*1969	RI-61	Groundwater levels and pumpage in thePeoria-Pekin area, Illinois 1890-1966. Marino-Schicht. 70p.
*1970	RS-162	Salt piling - A source of water supply pollution. Walker.
*1978	CR-199	Reconnaissance study of final cut impoundments. Gibb-Evans. 101p.
*1979	CR-208	Groundwater conditions and river-aquifer relationships along the Illinois Waterway. Gibb-Noel-Bogner-Schicht. 87p.
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*1989	CR-473	Regional assessment of northern Illinois ground-water resources. Nealon-Kirk-Visocky. 83p.
1992	CR-537	Ground-water investigation at Peoria, Illinois: Central well field area. Schicht. 36p.
1993	RR-124	Peoria-Pekin regional ground-water quality assessment. Burch-Kelly. 86p.
1996	CR-603	Evaluation of Ground-Water Resource near Test Holes 5-93 and 9-93 and Sustained Yield of Sankoty Well Field at Peoria, Illinois. Visocky-Sanderson. 267p.

WARREN

*1962	RI-43	Yields of deep sandstone wells in northern Illinois. Walton-Csallany. 47p.
*1963	RI-46	Yields of shallow dolomite wells in northern Illinois. Csallany-Walton. 44p.
*1966	RI-55	Yields of wells in Pennsylvanian and Mississippian rocks in Illinois. Csallany. 42p.
*1978	B-60-25	Public groundwater supplies in Warren County. Woller-Kunz-Sanderson. 20p.
*1980	CR-237	Assessment of eighteen public groundwater supplies in Illinois. Wehrmann-Visocky-Burris-Ringler-Brower. 185p.
1982	C-154	Water level trends, pumpage, and chemical quality in the Cambrian-Ordovician aquifer in Illinois, 1971-1980. Sasman-Benson-Ludwigs-Williams. 64p. $6.00.
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